NPP and NPOESS Data Exploitation Environment

NDE System Requirements Specification

DRAFT

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Change History

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The document version number identifies whether the document is a working copy, final, revision, or update, defined as follows:

- **Working copy or Draft:** a document not yet finalized or ready for distribution; sometimes called a draft. Use 0.1A, 0.1B, etc. for unpublished documents.
- **Final:** the first definitive edition of the document. The final is always identified as Version 1.0.
- **Revision:** an edition with minor changes from the previous edition, defined as changes affecting fewer than one-third of the pages in the document. The version numbers for revisions 1.1 through 1.9, 2.1 through 2.9, and so forth. After nine revisions, any other changes to the document are considered an update. A revision in draft, i.e. before being re-baselined, should be numbered as 1.1A, 1.1B, etc.
- **Update:** an edition with major changes from the previous edition, defined as changes affecting more than one-third of the pages in the document. The version number for an update is always a whole number (Version 2.0, 3.0, 4.0, and so forth).

Document Information Page

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Document Title	Draft NDE System Requirements Specification
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Author	Lou Fenichel
Approved By	

Table of Contents

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SRS1	# 1. SCOPE The purpose of the NPOESS Data Exploitation (NDE) System Requirements Specification is to identify the system requirements that will support customer needs for products from the NPOESS Preparatory Project (NPP) satellite as well as the NPOESS-C1 and NPOESS-C2 programs. These requirements also serve as the primary focal point for the traceability of all lower level or derived requirements documented in other NDE deliverables.
SRS3	## 1.1 System overview NOAA's NPOESS Data Exploitation (NDE) system will receive data from the NPOESS Interface Data Processing System (IDPS), process and package it to meet user requirements, ensure appropriate NDE unique products are archived, distribute data to authorized users, and provide customer service to users of its products. NDE's primary mission is to provide products derived from NPOESS observations to NOAA's operational and climate communities and to other civilian customers. In order to fulfill the mission, NDE will acquire the resources necessary to achieve the following objectives: • Disseminate NPOESS Data Records from the IDPS to customers • Generate and disseminate tailored NPOESS Data Records (versions of NPOESS Data Records in previously agreed alternative formats and views) • Generate and disseminate NOAA-unique products (augmented environmental products constructed from NPOESS Data Records) • Deliver NOAA-unique products and associated metadata to the NOAA's long term archive, the Comprehensive Large Array-data Stewardship System (CLASS) • Provide services to customers, including a Help Desk, NDE product training, product enhancement, and implementation support across NOAA • Coordinate NPOESS-related activities across NOAA - – Assist with planning for the implementation of NPOESS data by user systems - – Ensure end-user preparedness for NPOESS data • Develop a sustainable system that meets its customer needs • Provide software for NPOESS Data Record format conversion In order to support these objectives, the NDE System will be partitioned into Operational (OPS), System Test (TEST), and Development (DEV) Environments. Each environment will

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	be designed for a specific purpose for both the NPOESS Preparatory Project (NPP) era, as well as the NPOESS C1 and C2 eras.
SRS250	## 1.2 Document Overview The System Requirements Specification is based on the IEEE/EIA 12207 Standard for Software Life Cycle Processes published in 1995 by the Institute of Electrical and Electronics Engineers. This document was created and published using the DOORS 7.1 automated requirements management tool.
SRS251	## 1.3 Document Organization Section 1 provides introduction and background information. Section 2 lists the applicable and reference documentation. Section 3 provides the formal requirements statements. Section 4 provides the qualification provisions. Section 5 contains traceability information.
SRS5	# 2. REFERENCED DOCUMENTS • OMB Federal Enterprise Architecture (FEA) http://www.whitehouse.gov/omb/egov/a-1-fea.htmlNOAA's • NPOESS Data Exploitation Charter http://projects.osd.noaa.gov/nde • NPOESS IPO, Integrated Operational Requirements Document II (IORD II), version 6, 2002. • National Oceanic and Atmospheric Administration Information Quality Guidelines, September 30, 2002, http://www.noaanews.noaa.gov/stories/iq.htm • Concept of Operations (CONOPS) for the National polar-orbiting Operational Environmental Satellite System (NPOESS) Program, Version 1.2, September 15, 2003 • Comprehensive Large Array-data Stewardship System (CLASS) Archive, Access and Distribution System Allocated Requirements, Version 1 • Concept of Operations for the National Environmental Satellite, Data, and Information Service: 2010-2020, 2002 • National Oceanic and Atmospheric Administration (NOAA) Concept of Operations (CONOPS) For NPOESS Data Exploitation (NDE), Version 2.0, 08/03/05

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SRS6	# 3. REQUIREMENTS
SRS7	## 3.1 Required States and Modes
SRS79	### 3.1.1 OPEN MODE The nominal operation of the System will be known as the **Open Mode**, where all users will be authorized for read-only access to all Data Products.
SRS80	### 3.1.2 DEGRADED OPERATIONS MODE The System will support a **Degraded Operations Mode**, where data will be distributed to a customer only if they meet pre-defined criteria.
SRS95	#### 3.1.2.1 Degraded Operations Notification Customers are notified that the System is entering a Degraded Operations Mode as specified in their particular ICD.
SRS81	### 3.1.3 DATA DENIAL MODE The System will support a **Data Denial Mode**, where only users meeting certain criteria will be authorized for access to the data. Criteria will be defined in the NDE System Data Denial Plan. The NPP mission is exempt from this requirement.
SRS96	#### 3.1.3.1 Data Denial Notification Authorized users will be informed when they receive restricted access data, and, via Operational Agreement, will accept full responsibility for restricting distribution to their users. Unauthorized Users can receive data at least 3 hours after observation, and will not be informed of a Data Denial Event. National Command Authority (NCA) directives may override the NDE List of Authorized Users and/or may require additional restrictions.
SRS8	## 3.2 Capability Requirements
SRS48	### 3.2.1 INGEST SUBSYSTEM

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SRS76	**3.2.1.1 Define Data Products** The System shall provide the capability to define Data Products for Ingest.
SRS205	*3.2.1.1.1 Data Product Definition GUI* The System will have an online Data Product Definition interface where all product definition metadata will be entered and updated.
SRS208	*3.2.1.1.2 Tailoring Tool Definition GUI* The System will have an online Tailoring Tool Definition interface where all tailoring tool definition information will be entered and updated.
SRS206	*3.2.1.1.3 Data Product Approval* The System will have an online interface for operators to approve data products for inclusion into opreations once SDSRB Approval has been secured.
SRS77	**3.2.1.2 Define System Elements** The System shall provide the capability to define System Elements including Scientific Algorithms, Product Tailoring Tools, Data Conversion Tools, and other pre-defined transformation utilities.
SRS207	*3.2.1.2.1 Algorithm Definition GUI* The System will have an online Algorithm Definition interface where all algorithm definition information will be entered and updated.
SRS56	**3.2.1.3 Receive from IDPS** The System shall provide the capability to receive data and products from IDPS.
SRS57	*3.2.1.3.1 xDR Ingest from IDPS* The System shall be capable of requesting and accepting all xDRs and IPs generated by the IDPS.
SRS62	*3.2.1.3.2 SARSAT Telemetry from IDPS* The System shall be capable of accepting SARSAT Telemetry from the IDPS.

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SRS63	*3.2.1.3.3 A-DCS Data from IDPS* The System shall be capable of accepting ADCS Data from the IDPS.
SRS58	*3.2.1.3.4 Product Subscriptions to the IDPS* The System shall provide the capability to submit product subscriptions to the IDPS.
SRS59	*3.2.1.3.5 Ad Hoc Requests to the IDPS* The System shall be capable of submitting Ad Hoc requests to the IDPS.
SRS60	*3.2.1.3.6 Data Delivery Notifications* The System will have the capability to receive completeness information from the IDPS.
SRS64	*3.2.1.3.7 Send IDPS Data Receipt* The System shall provide the capability to send a Data Receipt to IDPS for each data granule ingested.
SRS61	**3.2.1.4 Ancillary Data Product Acquisition** The System shall provide the capability to acquire ancillary products necessary for Data Product Generation.
SRS65	**3.2.1.5 Receive from CLASS** The System shall provide the capability to receive data from CLASS.
SRS66	*3.2.1.5.1 Data Products from CLASS* The System shall be capable of accepting Data Products delivered from CLASS.
SRS67	*3.2.1.5.2 System Elements from CLASS* The System shall be capable of accepting System Elements delivered from CLASS.
SRS70	*3.2.1.5.3 Send CLASS Data Receipt* The System shall provide the capability to send a Data Receipt to CLASS for each Data

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	Product or System Element received.
SRS49	**3.2.2 PRODUCTION SUBSYSTEM**
SRS72	**3.2.2.1 Configure Scientific Algorithms** The System shall provide the capability to configure Scientific Algorithms for execution.
SRS78	*3.2.2.1.1 Integrate Delivered Algorithm Packages* The System shall provide the capability to integrate Scientific Algorithms in the Data Handling System.
SRS99	*3.2.2.1.2 Test Algorithms* The Development Environment will be capable of testing Scientific Algorithms via a full day's throughput of data.
SRS100	*3.2.2.1.3 Maintain Records of Data and System Elements* The System will maintain a records of archived data and archived System Elements.
SRS73	**3.2.2.2 Schedule Algorithm Execution** The System shall provide a rules-based capability to control the scheduling of Scientific Algorithms.
SRS74	**3.2.2.3 Data Product Generation** The System shall provide the capability to manage Data Product Generation in order to maximize throughput according to pre-defined priorities.
SRS101	*3.2.2.3.1 Available Data Product Projections* The System will provide the capability to convert data products into platcarre, Mercator, and polar stereographic projections.
SRS102	*3.2.2.3.2 Available Data Product Aggregations* The System will have the capability to aggregate Data Products at frequencies not to exceed 168 hours.

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SRS103	*3.2.2.3.3 Available Grid Spacing* The System will have the capability to generate both NOAA-Unique and Tailored Data Products with customer-specified grid spacing subject to the approval of the Product Area Lead (PAL).
SRS104	*3.2.2.3.4 Accuracy of Re-Gridded Data Products* Re-gridded products must contain no less data than the IDPS-supplied products from which they were derived unless the end-user formally agrees to lower resolution.
SRS105	*3.2.2.3.5 Available Data Formats* The System will have the capability to reformat Data Products into BUFR, GRIB, FF, GIF,GeoTIFF, McIDAS, HDF4, HDF5, HDF-EOS, SARAD, SATEM, and netCDF formats.
SRS106	*3.2.2.3.6 Preserve HDF5 Accuracy* Reformatted products must preserve the contents of HDF5 versions with the accuracy established for the reformatting tool.
SRS107	*3.2.2.3.7 OS Choices for Data Format Tools* The System shall provide Data Formatting tools capable of execution by customers using "standard" Operating Systems (e.g., RedHat LINUX, AIX, etc.) and telecommunications (e.g., FTP, Internet, API, etc.).
SRS108	*3.2.2.3.8 Available Compression Formats* Prior to the NPOESS-C1 mission, the NDE System shall provide tools to compress Data Products into GZIP, ZIP, RICE, JPEG, and MPEG formats.
SRS111	*3.2.2.3.9 Accuracy of Aggregated Products* Aggregated Data Products must accurately represent the separate elements from which the product was assembled.
SRS112	*3.2.2.3.10 Product Enhancement Requests* The Contractor shall provide a mechanism for customers to request enhancements to Data Products.

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SRS113	*3.2.2.3.11 Data Product Versions* The Contractor shall develop and implement procedures to change Data Products through version control.
SRS114	*3.2.2.3.12 72 Hour Data Product Recovery* The System shall be able to process archived data that is retrieved from CLASS for the purpose of recovering from failures in the current near real-time processing stream. NDE will perform NO REPROCESSING of data older than 72 hours (except for that outlying data needed in conjunction with products being generated from the current 72-hour stream).
SRS50	**3.2.3 DISTRIBUTION SUBSYSTEM**
SRS117	**3.2.3.1 NPOESS Product Availability** The System shall provide the capability to make NPOESS Data Products available to customers.
SRS209	*3.2.3.1.1 User Subscriptions* The System will provide an online capability for registered users to subscribe to xDRs, IPs, Ancillary, NOAA-Unique, and Tailored Data Products if authorized.
SRS119	*3.2.3.1.2 Archive NOAA-Unique Data Products* The System shall provide the capability to archive all NOAA-Unique Data Products to the CLASS Long-Term Archive (LTA).
SRS245	3.2.3.1.2.1 FtpPush Archive Manifest to CLASS The System will generate and transfer an archive manifest to CLASS via FTP Push as specified in the CLASS ESPC ICD.
SRS246	3.2.3.1.2.2 Provide Manifest and File Reports to CLASS The System will provide Manifest and File Reports used for reconciliation to CLASS once every 24 hours that reflect NDE activities for the last 72 hours.
SRS210	*3.2.3.1.3 Receipt from CLASS*

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	The System shall provide the capability to receive an archive status message from CLASS.
SRS118	**3.2.3.2 FTP Push Delivery** The System will be able to deliver (via FtpPush) products to customer's computer systems in the event that customers choose this method of delivery.
SRS120	**3.2.3.3 Order Status Notification** The System will support customer notifications of Order Status and System conditions.
SRS121	*3.2.3.3.1 Automatic Order Status Notification Options* Customers, including developers, of the Operational System, and of the Test System in the Quasi-Operational state, shall be notified automatically about the status of their orders according to selections made during subscription, from a standard list of notification options. It is not necessarily the case that all options will be made available to all users; such a capability might conflict with other requirements, such as Data Denial.
SRS211	*3.2.3.3.2 Manual Order Status Notification* The System will provide an online capability for registered users to request order and system condition information if authorized.
SRS122	**3.2.3.4 Cost-Effectiveness** The Contractor shall develop and implement procedures to distribute NPOESS-based Data Products to customers in a cost-effective manner.
SRS216	*3.2.3.4.1 Trade Study and Alternatives* The Contractor shall undertake a trade study and report on the costs and benefits of implementing feasible product communication schemes and communication infrastructure alternatives, including Points of Presence (POPs).
SRS51	**3.2.4 CUSTOMER SERVICES SUBSYSTEM**
SRS212	**3.2.4.1 User Registration** The System shall provide the capability to register users for the purpose of controlling their access to System Elements and Data Products.

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SRS213	*3.2.4.1.1 User Registration GUI* The System will provide an online interface that allows users to register for access to NDE System Elements and Data Products.
SRS214	*3.2.4.1.2 User Registration Approval* The System will provide the capability for operators to approve user registration requests.
SRS123	**3.2.4.2 NDE Service Requests** Starting with the NPOESS-C1 mission, the System shall provide an interface for customers and developers to request NDE supported reformatting tools for use on their systems.
SRS220	**3.2.4.3 NDE Service Responses** The System shall provide an interface for NDE personnel to respond to Service Requests with Service Responses on a 24 x 7 availability basis.
SRS124	**3.2.4.4 Track Electronic Correspondence** All electronic correspondence shall be maintained online for immediate access for a period of two years, and shall be trackable by source, destination, and date, This includes requests for NDE service, product enhancement requests, and NDE responses; all such requests should be tracked so that they can be extracted from the entire collection for viewing or reporting purposes.
SRS125	*3.2.4.4.1 Correspondence Tracking* All Electronic Correspondence maintained online, including requests for NDE service, product enhancement requests, and NDE responses, shall be linked so as to readily recover the back and forth trail of any dialogues.
SRS126	*3.2.4.4.2 Correspondence Backup* Electronic Correspondence, including requests for NDE service, product enhancement requests, and NDE responses, shall be maintained on stable backup media (e.g., CD) indefinitely.
SRS127	**3.2.4.5 Track Hardcopy Correspondence** All Hardcopy Correspondence, including requests for NDE service, product enhancement

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	requests, and NDE responses, shall be retained in an environment controlled for the preservation of documents; requests for NDE service, product enhancement requests, and NDE responses should be kept separately from the general correspondence.
SRS52	**3.2.5 SYSTEM MONITORING AND CONTROL SEGMENT**
SRS128	**3.2.5.1 Health and Status** The System shall collect information regarding infrastructure health and status, as well as status and immediately report performance of all scheduled tasks at all times. This information shall be available to the operators of the system with a lag time of no more than 2 minutes.
SRS129	*3.2.5.1.1 Notification of Anomalous System Conditions* Customers, including developers of the Operational System and of the Test system in Quasi-Operational state, shall on an ad hoc basis be able to receive notification about the condition of the System. It is not necessarily the case that all conditions will be made known to all users; such a capability might conflict with other requirements, such as Data Denial.
SRS87	**3.2.5.2 Provide Automatic Failover** The System shall provide an automatic failover capability that will re-create a fully functioning configuration from a failed configuration with no more than 1% of the tasks requiring manual intervention.
SRS130	*3.2.5.2.1 OPS Failover to Test* In the event of an emergency failover of the Operational Environment during the NPOESS C1 or C2 missions, the System Test Environment will be able to deliver products to the operational community within the same throughput and latency parameters as the operational system.
SRS131	**3.2.5.3 Monitor Operational Quality of Data** The Contractor shall develop and implement procedures to control operational product quality by identifying deficiencies of ingested data or metadata received by IDPS, as well as identifying deficiencies of NDE output products.
SRS132	*3.2.5.3.1 Quality Flag Recognition and Reporting*

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	Operational Quality Monitoring procedures will include recognition and reporting of all Quality Flags received from IDPS.
SRS133	**3.2.5.4 Data Product Latency Table** The System will have the capability to maintain a Data Product Latency Table, which will contain elapsed times by Data Product that define the point-in-time when all of the required xDRs needed to create or to tailor a product are received from the IDPS and the point-in-time when the Tailored or NOAA-Unique product is made available for distribution to customers.
SRS134	**3.2.5.5 Capture Performance Statistics** The Contractor shall develop and implement procedures to log performance data.
SRS135	**3.2.5.6 Performance Reports** The System will produce both Scheduled and On-Demand Performance Reports.
SRS248	**3.2.6 PRODUCT MANAGEMENT SUBSYSTEM**
SRS9	**3.3 External interface requirements**
SRS243	**3.3.1 IDPS DATA ACQUISITION** The System shall provide the capability to acquire all xDRs, Intermediate Products, SARSAT Telemetry, A-DCS, ancilliary, and auxiliary data and metadata from IDPS.
SRS244	**3.3.2 EXTERNAL ANCILLARY DATA ACQUISITION** The System will provide the capability to configure ancillary data acquisition streams from external sources.
SRS10	**3.3.3 DATA PRODUCT RETRIEVAL** The NOAA-Unique and Tailored Products generated by NDE shall be made available to customers by placement in locations where data can be extracted within a time not to exceed the time specified in the Data Product Latency Table.
SRS136	**3.3.4 COMPREHENSIVE LARGE ARRAY-DATA STEWARDSHIP SYSTEM (CLASS)**

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SRS137	**3.3.4.1 Archive Data Used for Functional Testing** Metadata and ancillary data, as well as Intermediate , NOAA-Unique, and Tailored Products used in documented Functional Tests, will be sent to CLASS.
SRS138	**3.3.4.2 Retrieve Data from CLASS** The System will have the capability to retrieve data from CLASS.
SRS140	**3.3.5 MMC INTERFACE THROUGH ESPC** ESPC Operations shall provide an interface between NDE and the NPOESS Mission Management Center (MMC) such that 100% of the NDE inquiries to the MMC and NDE replies to MMC reuests are received by the MMC in a time not to exceed that specified in the ICD, and that 100% of the notifications and inquiries from the MMC to NDE are received by NDE in a time not to exceed that specified by the ICD.
SRS141	**3.3.6 SERVICE REQUESTS TO IPO** An interface for NDE service requets to the IPO shall be provided such that 100% of the NDE service requests intended for the IPO are delivered to IPO and 100% of the IPO responses to NDE service requests are received by NDE.
SRS142	**3.3.7 SERVICE REQUESTS TO IDPS** The System shall provide the capability to enable the ESPC/NDE Operations Staff to communicate with the IDPS Operations Staff.
SRS235	**3.3.8 ESPC TROUBLE TICKETS** The System shall provide the capability to interface with the ESPC Trouble Ticket system.
SRS11	**3.4 Internal Interface Requirements**
SRS143	**3.4.1 USE AUTOMATIC SCHEDULER** The Contractor shall utilize an automated scheduler to initiate automated tasks with temporal events.
SRS144	**3.4.2 RELIABILITY OF AUTOMATED TASKS**

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	99% of scheduled automated tasks will execute on time within a tolerance to be established individually for each task by NDE management.
SRS145	### 3.4.3 SUPPORT PROCESSING STRINGS The System will provide the capability of transferring information between automated tasks, so that a predecessor task can provide input and/or control information to dependent tasks.
SRS12	## 3.5 Internal data Requirements
SRS147	### 3.5.1 MAINTAIN CATALOG OF TEST DATA The System will provide the capability to maintain sets of test, historical, and experimental data with a minimum of duplication.
SRS148	### 3.5.1.1 Data Disuse Delete The System will have the capability to delete Data resources after a configurable interval of disuse.
SRS149	### 3.5.1.2 Data Invalid Delete The System will have the capability to delete Data resources when the data format/contents are no longer valid for use in testing, historical, or experimental needs.
SRS150	### 3.5.1.3 Control Shared Data Resources The System will allow users to add, update, and delete shared data resources in a controlled manner according to agreed user (either developer, tester, or customer) needs.
SRS151	### 3.5.1.4 Shared Data Resources Maintenance The System will provide the capability to maintain a shared, CM-controlled store of test data indefinitely.
SRS152	### 3.5.1.5 FGDC Standards Violations The System shall validate and report on all ingested, generated, and distributed data according to the FGDC Content Standard for Digital Geospatial Metadata.
SRS153	### 3.5.1.6 Anomalous Data Values

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	The System shall identify and report on all instances of anomalous data values.
SRS154	**3.5.2 NOAA-UNIQUE PRODUCT SHELF LIFE** NOAA-Unique products shall be retained in NDE for up to 72 hours.
SRS155	**3.5.3 CUSTOMER SPECIFIED DATA PRODUCT RETENTION** The System will have the capability to allow customers to control the length of time their Data Products are available, not to exceed 72 hours.
SRS156	**3.5.4 MAINTAIN ANCILLARY TEST DATA** The Contractor shall review and certify Ancillary Data.
SRS13	**3.6 Adaptation Requirements**
SRS158	**3.6.1 CURRENCY OF RESOURCES** The Contractor shall execute all necessary upgrades to the Operations, System Test, and Development Environment components in accordance with vendor changes and NESDIS standards.
SRS159	**3.6.2 SCALABILITY** The Operations, System Test, and Development Environments will be scalable--that is, additional capacity (throughput, latency, performance) can be added to it as needed without redesign of the system infrastructure. It will be scalable from the initial system to support NPP up through a system to support the simultaneous operations of NPOESS-C1 and NPOESS-C2.
SRS15	**3.7 Security and Privacy Requirements**
SRS160	**3.7.1 FOLLOW ESPC SECURITY PROCEDURES** The Contractor shall follow ESPC (DoC/NOAA/NESDIS) procedures and policies for securing ESPC systems.
SRS161	**3.7.1.1 Keep NDE Safe** An ESPC System, or ESPC data, will never be compromised.

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SRS162	### 3.7.2 BACKUP OF EACH ENVIRONMENT Fully backed up versions of the Operational, System Test, and Development Environments shall be maintained so that all data necessary to commence normal operations of each of the three environments is current to within 2 hours of the time that a system failure took place.
SRS163	### 3.7.3 NDE SECURITY PROCEDURES The NDE Secure Procedures and Technologies shall protect the integrity of NDE data in the event of human errors when data is entered, errors from computer to computer transmission, errors from software bugs and/or viruses, and errors due to hardware malfunctions, such as disk crashes.
SRS164	### 3.7.4 ESPC NETWORK AUTHORIZATION The NDE network can be accessed only with the authorization of ESPC.
SRS165	### 3.7.5 SECURITY DOCUMENTATION The Contractor shall provide documentation for inclusion into ESPC Security Procedures detailing Risk Assessment, Test and Evaluation, and Contingency Planning.
SRS17	## 3.8 Computer resource requirements
SRS18	### 3.8.1 COMPUTER HARDWARE REQUIREMENTS
SRS166	#### 3.8.1.1 Existing Hardware The System shall be constructed using existing hardware where it is possible, practical, and approved by the Government. Inventory will be provided to the Contractor by OSDPD IT Lead.
SRS19	### 3.8.2 COMPUTER HARDWARE RESOURCE UTILIZATION REQUIREMENTS
SRS20	### 3.8.3 COMPUTER SOFTWARE REQUIREMENTS
SRS167	#### 3.8.3.1 Existing Software The System shall be constructed using existing software where it is possible, practical, and

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	approved by the Government. Inventory will be provided to the Contractor by OSDPD IT Lead.
SRS93	**3.8.3.2 COTS and Open Source** The NDE Processing System Design will use COTS and Open Source software where it is possible, practical, and approved by the Government.
SRS168	**3.8.3.3 Reusability** The NDE System Elements shall be designed to be reused in other Satellite Data Processing applications.
SRS169	**3.8.3.4 Modularity** The NDE System Elements shall be designed so that Scientific Algorithms are invoked as objects.
SRS21	**3.8.4 COMPUTER COMMUNICATIONS REQUIREMENTS**
SRS170	**3.8.4.1 Sufficient Bandwidth** The Contractor will provide communication pathways with sufficient bandwidth to allow the exchange of 4Gbits/sec of large experimental datasets and products between ESPC and external NOAA development partners such as the Cooperative Institutes.
SRS22	**3.9 Software quality factors**
SRS171	**3.9.1 NDE CM STANDARDS** The Contractor shall evaluate candidate System Elements for conformity to Configuration Management standards.
SRS172	**3.9.2 TESTING REQUIREMENTS** The Contractor shall evaluate candidate System Elements for operational fitness using Unit, Integration, Regression, Stress (load), and End-to-End System testing.
SRS173	**3.9.2.1 Algorithm Testing Expectations** Each algorithm for creating NOAA-Unique products will be described in terms of explicit,

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	expected test results prior to the installation of the NOAA-supplied algorithm on the operational product generation system. The NOAA-Unique algorithms must satisfy these test requirements.
SRS174	**3.9.2.2 System Test Staffing** The System Test Environment will be administered by a dedicated team that manages the testing process with a goal of no more than five full-time equivalents.
SRS175	**3.9.2.3 OPS Success Rate** Within their first three execution cycles no more than 5% of the System Elements installed into the Operational Environment shall fail or cause other System Elements to fail or perform less effectively.
SRS176	**3.9.2.4 Sanity Check for Install into Test** Prior to transfer to the System Test Environment, algorithms that can be tested using historical reference data should be tested and tuned so that when they use a historical dataset they execute in no more than 50% of the clock time of a similar product generation execution in the Operational Environment.
SRS23	**3.10 Design and Implementation Constraints**
SRS204	**3.10.1 ADOPT DESIGN METHODOLOGY** The Contractor shall identify a widely accepted software engineering methodology to be used on the project.
SRS215	**3.10.2 USE PROVEN TECHNOLOGIES** The contractor shall develop the data processing elements of the future NDE system using the latest proven technologies (programming languages, CASE tools, object repositories, data base management systems, etc.) that are appropriate for remote sensing data processing.
SRS217	**3.10.2.1 Use a 4GL** The Contractor shall develop the data processing elements of the future NDE system using tools that will support the ability to alter executable components without altering source code.

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SRS24	## 3.11 Personnel-Related requirements
SRS177	### 3.11.1 MMC SERVICE REQUESTS The Contractor shall develop and implement procedures to submit Service Requests to NPOESS/MMC, to log and track these Service Requests, and to log and track all MMC responses.
SRS178	### 3.11.2 IPO SERVICE REQUESTS The Contractor shall develop and implement procedures to submit Service Requests to IPO/CCB, to log and track these Service Requests, and to log and track all IPO/CCB responses.
SRS179	### 3.11.3 IDENTIFY PERFORMANCE STATISTICS FOR CAPTURE The Contractor shall identify standard measures of automated system component performance that can be captured during runtime and retrieved for analysis.
SRS180	### 3.11.4 OPERATORS MONITOR LATENCY The Operators shall check schedules and wall clock for NDE data latency and interface with the appropriate center.
SRS181	### 3.11.5 PROBLEM RESOLUTION The Contractor shall assist in diagnosing and resolving problems with production processing, operator monitoring and distribution.
SRS182	### 3.11.6 IDENTIFY ALGORITHM TEST PROCEDURES The Contractor shall cooperate with algorithm developers to identify System Test proecedures, standards, and the criteria to be applied in determining a system elements' fitness for operational status.
SRS183	### 3.11.7 IDENTIFY AUTOMATED BACKUP PROCEDURES The Contractor shall develop and implement automated backup procedures for each of the three environments: Operations, System Test, and Development.

Reqt Id	Reqt Text
SRS184	**3.11.8 RESTART PROCEDURES** The Contractor shall develop and implement procedures to restart each of the three environments: Operations, System Test, and Development.
SRS185	**3.11.9 PROCEDURES TO PROTECT DATA INTEGRITY** The Contractor shall implement secure procedures and technologies to protect the integrity of NDE data.
SRS187	**3.11.9.1 Monitor Operational Quality** The System will contain Operational Quality Monitoring procedures that will detect and report on acceptability of xDR metadata according to configurable thresholds.
SRS186	**3.11.10 DATA AUTHORIZATION PROCEDURES** The Contractor shall implement procedures and technologies to ensure that NDE information is accessible only to those authorized to have access.
SRS188	**3.11.11 DEGRATED OPERATIONS NOTIFICATION** The Contractor shall develop and implement procedures to consult with the Government and notify affected customers as a result of an NPOESS status change to Degraded Operations.
SRS189	**3.11.12 ARCHIVE DATA AND SYSTEM ELEMENTS USED** The Contractor shall develop and implement procedures to deliver all data and System Elements required by NDE for the production of both NOAA-Unique and Tailored Products to the CLASS LTA.
SRS190	**3.11.13 RETRIEVE ARCHIVED DATA** The Contractor shall develop and implement procedures to retrieve archived data from CLASS.
SRS191	**3.11.14 PROCESS ARCHIVED DATA** The Contractor shall develop and implement procedures to process archived data.
SRS218	**3.11.15 ALLOCATE HUMAN RESOURCES**

Reqt Id	Reqt Text
	The Contractor shall allocate resources to perform planned tasks.
SRS219	**3.11.16 REPORT ON TASK PERFORMANCE** The Contractor shall report on the performance of scheduled tasks, that is, the cost and schedule status of each planned task.
SRS25	**3.12 Training-Related requirements**
SRS26	**3.13 Logistics-Related requirements(not applicable)**
SRS27	**3.14 Other requirements**
SRS53	**3.14.1 AVAILABILITY REQUIREMENTS**
SRS192	**3.14.1.1 xDR Availability** NPOESS-based products will be available to customers a configurable number of minutes after receipt from the NESDIS product processing system, according to the information in the NDE Data Product Latency Table.
SRS193	**3.14.1.2 Distribution Availability** Starting with the NPOESS-C1 mission, NDE product distribution capabilities shall not be interrupted for more than 2 hours in any 24 hour period and no more then 4 hours in any 30 day period.
SRS89	**3.14.1.3 Interruptions to Operations** Starting with the NPOESS-C1 mission, the NDE Operational Environment shall not be interrupted for more than 2 hours in any 24 hour period and no more than 4 hours in any 30 day period.
SRS91	**3.14.1.4 Interruptions to Development** The Development Environment will be available to at least 100 developers 95% of the time over any twelve month period. The NPP mission is exempt from this requirement.
SRS88	**3.14.1.5 Interruptions to Product Generation**

Reqt Id	Reqt Text
	Starting with the NPOESS-C1 mission, Operational Production processing flow shall not be shall not be interrupted for more than 2 hours in any 24 hour period and no more than 4 hours in any 30 day period.
SRS222	**3.14.1.6 Product Availability**
SRS223	*3.14.1.6.1 Data Products for Authorized Users* The Contractor shall provide a capability for ensuring that NDE's tailored products and NOAA-unique products are made available to authorized customers and developers.
SRS224	*3.14.1.6.2 Data Products in Real-Time* The Contractor shall provide a capability for ensuring that NDE's Tailored and NOAA-Unique products are placed in locations from which they can be retrieved by customers in real time. The NPP mission is exempt from this requirement.
SRS225	*3.14.1.6.3 Data Products for Developers* The Contractor shall provide a capability for ensuring that NDE's tailored products and NOAA-unique products are placed in locations from which they can be retrieved by developers.
SRS54	**3.14.2 PERFORMANCE REQUIREMENTS**
SRS194	**3.14.2.1 IDPS Data Access Latency** The System shall be able to access data from IDPS within ten seconds of completion of transmission.
SRS195	**3.14.2.2 MMC Message Latency** The System will have the capability to send/receive messages to/from the NPOESS Mission Management Center (MMC) with a delay no greater than ten seconds.
SRS86	**3.14.2.3 System Capacity/Product Volumes** During the NPP mission, the System will have the capability to support product volumes of 4 TB/day. During the NPOESS C1 mission, the System will have the capability to support product volumes of 8 TB/day.

Reqt Id	Reqt Text
	During the NPOESS C2 mission, the System will have the capability to support product volumes of 12 TB/day.
SRS196	**3.14.2.4 SARSAT PassThrough** The System shall deliver SARSAT Telemetry from IDPS to USMCC within 30 seconds of their receipt from NESDIS.
SRS197	**3.14.2.5 A-DCS PassThrough** The System shall deliver A-DCS Data from IDPS to the US Global Processing Center within 30 seconds of their receipt by NESDIS.
SRS198	**3.14.2.6 Recovery from Natural Disasters** During the NPOESS C1 and C2 missions, NDE secure procedures and technologies shall protect the integrity of NDE data in the event of natural disasters, such as fires and floods, with loss of no more than 24 hours of data.
SRS83	**3.14.3 NDE ENVIRONMENTS** The System shall be designed to support Operational, System Test, and Development Environments.
SRS237	**3.14.3.1 Operational Environment** The Contractor shall provide an Operational Environment design that lowers the cost and risks of generating and distributing NPOESS-derived products to customers.
SRS85	**3.14.3.2 Segregated Development Environment** The System shall provide the capability to support the development of the Data Handling System and the development and integration of Scientific Algorithms in a segregated Development Environment.
SRS84	**3.14.3.3 Quasi-Operational Environment** During the NPP mission, the System Test Environment will be segregated in a manner that supports "Quasi-Operational" product generation and distribution (Quasi-Operational is defined as 24 X 7 automated product generation and distribution with 8 X 5 Science and Operations support services).

Reqt Id	Reqt Text
SRS92	**3.14.4 FEDERAL ENTERPRISE ARCHITECTURE** The NDE IT Enterprise Architecture (EA) will be compliant with the OMB Federal Enterprise Architecture (FEA). Guidance is to be obtained at the FEA website at http://www.whitehouse.gov/omb/egov/a-1-fea.html
SRS94	**3.14.5 GOVERNMENT CAPABILITY MATURITY MODEL** The Contractor shall design NDE so that it conforms to the accepted Government Level 4 Architecture Capability Maturity Model.
SRS199	**3.14.6 SEI CAPABILITY MATURITY MODEL** The Contractor shall design the System so that its management capabilities can be evaluated in terms of the Software Engineering Institute's (SEI) Capability Maturity Model (CMM), with the goal of Level 2 certification during proposal evaluation and Level 3 certification three years after contract award.
SRS200	**3.14.7 CERTIFICATION AND ACCREDITATION** The Contractor shall provide the documentation needed for Information System Certification and Accreditation.
SRS201	**3.14.8 NOAA IT BEST PRACTICES** The System shall be designed and built with NOAA IT "Best Practices" guidance from the NESDIS Information Technology Architecture Team (ITAT).
SRS202	**3.14.9 PROMOTION OF SYSTEM ELEMENTS** Completed Test Packages submitted to Test Engineers will be evaluated for operational fitness in approximately five working days after submission.
SRS203	**3.14.10 DEVELOPMENT LIFECYCLE TOOLS** The Contractor will specify a suite of proven development lifecycle tools to enhance NESDIS capabilities in performing developmental and software maintenance tasks. The documentation will demonstrate that the selected tools are widely supported in the remote sensing software industry and the most likely to be known by future NESDIS support staff. Technologies in this category are: CASE tools, modeling tools, 4th Generation Languages, Testing tools, and Requirements Tracking tools.

Reqt Id	Reqt Text
SRS30	# 4. QUALIFICATION PROVISIONS TBD.
SRS31	# 5. REQUIREMENTS TRACEABILITY
SRS90	## 5.1 NDE Contract Section J The Section J portion of the NDE Contract specifies NDE System requirements in terms of Desired Outcomes, Required Services, Performance Standards, and Monitoring Methods. These requirements have been used as a basis for the SRS items in the Section 5.2 Traceability Table.
SRS32	## 5.2 Traceability Table

Reqt Id	Section	Reqt Title	Sec J	Subsystem
SRS10	3.3.3	Data Product Retrieval	XF3	Distribution
SRS100	3.2.2.1.3	Maintain Records of Data and System Elements	DA7	Production
SRS101	3.2.2.3.1	Available Data Product Projections	PG5	Production
SRS102	3.2.2.3.2	Available Data Product Aggregations	PG6	Production
SRS103	3.2.2.3.3	Available Grid Spacing	PG7	Production
SRS104	3.2.2.3.4	Accuracy of Re-Gridded Data Products	PG7	Production
SRS105	3.2.2.3.5	Available Data Formats	PG1	Production
SRS106	3.2.2.3.6	Preserve HDF5 Accuracy	PG1	Production
SRS107	3.2.2.3.7	OS Choices for Data Format Tools	PG2	Production
SRS108	3.2.2.3.8	Available Compression	PG3	Production

Reqt Id	Reqt Text				
			Formats		
	SRS111	3.2.2.3.9	Accuracy of Aggregated Products	PG6	Production
	SRS112	3.2.2.3.10	Product Enhancement Requests	PG12	Production
	SRS113	3.2.2.3.11	Data Product Versions	DA12	Production
	SRS114	3.2.2.3.12	72 Hour Data Product Recovery	DA9	Production
	SRS117	3.2.3.1	NPOESS Product Availability	CD6	Distribution
	SRS118	3.2.3.2	FTP Push Delivery	I2	Distribution
	SRS119	3.2.3.1.2	Archive NOAA-Unique Data Products	DA6	Distribution
	SRS120	3.2.3.3	Order Status Notification	SM19	Distribution
	SRS121	3.2.3.3.1	Automatic Order Status Notification Options	SM19	Distribution
	SRS122	3.2.3.4	Cost-Effectiveness	SE3	Distribution
	SRS123	3.2.4.2	NDE Service Requests	XF12	Customer Services
	SRS124	3.2.4.4	Track Electronic Correspondence	SM21	Customer Services
	SRS125	3.2.4.4.1	Correspondence Tracking	SM21	Customer Services
	SRS126	3.2.4.4.2	Correspondence Backup	SM22	Customer Services
	SRS127	3.2.4.5	Track Hardcopy Correspondence	SM21	Customer Services
	SRS128	3.2.5.1	Health and Status	SM5	Monitoring and Control
	SRS129	3.2.5.1.1	Notification of Anomalous	SM19	Monitoring and

Reqt Id	Reqt Text				
			System Conditions		Control
	SRS130	3.2.5.2.1	OPS Failover to Test	I2	Monitoring and Control
	SRS131	3.2.5.3	Monitor Operational Quality of Data	SM18	Monitoring and Control
	SRS132	3.2.5.3.1	Quality Flag Recognition and Reporting	SM17	Monitoring and Control
	SRS133	3.2.5.4	Data Product Latency Table	CD9	Monitoring and Control
	SRS134	3.2.5.5	Capture Performance Statistics	SM23	Monitoring and Control
	SRS135	3.2.5.6	Performance Reports	SM24	Monitoring and Control
	SRS137	3.3.4.1	Archive Data Used for Functional Testing	DA5	Distribution
	SRS138	3.3.4.2	Retrieve Data from CLASS	DA8	Ingest
	SRS140	3.3.5	MMC Interface Through ESPC	XF9	Infrastructure
	SRS141	3.3.6	Service Requests to IPO	XF10	Infrastructure
	SRS142	3.3.7	Service Requests to IDPS	XF11	Infrastructure
	SRS143	3.4.1	Use Automatic Scheduler	SM2	Production
	SRS144	3.4.2	Reliability of Automated Tasks	SM2	Infrastructure
	SRS145	3.4.3	Support Processing Strings	SM3	Production
	SRS147	3.5.1	Maintain Catalog of Test Data	DA2	Infrastructure
	SRS148	3.5.1.1	Data Disuse Delete	DA2	Infrastructure
	SRS149	3.5.1.2	Data Invalid Delete	DA2	Infrastructure

Reqt Id	Reqt Text				
	SRS150	3.5.1.3	Control Shared Data Resources	DA2	Infrastructure
	SRS151	3.5.1.4	Shared Data Resources Maintenance	DA2	Infrastructure
	SRS152	3.5.1.5	FGDC Standards Violations	DA10	Customer Services
	SRS153	3.5.1.6	Anomalous Data Values	DA11	Customer Services
	SRS154	3.5.2	NOAA-Unique Product Shelf Life	DA1	Distribution
	SRS155	3.5.3	Customer Specified Data Product Retention	DA3	Customer Services
	SRS156	3.5.4	Maintain Ancillary Test Data	PG10	System
	SRS158	3.6.1	Currency of Resources	I1	Infrastructure
	SRS159	3.6.2	Scalability	I1	Infrastructure
	SRS160	3.7.1	Follow ESPC Security Procedures	SA5	Documentation
	SRS161	3.7.1.1	Keep NDE Safe	SA5	Security
	SRS162	3.7.2	Backup of Each Environment	SM7	Infrastructure
	SRS163	3.7.3	NDE Security Procedures	SM9	Security
	SRS164	3.7.4	ESPC Network Authorization	CD4	Networks
	SRS165	3.7.5	Security Documentation	SE6	Documentation
	SRS166	3.8.1.1	Existing Hardware	SE9	Infrastructure
	SRS167	3.8.3.1	Existing Software	SE9	Infrastructure
	SRS168	3.8.3.3	Reusability	SE2	Infrastructure
	SRS169	3.8.3.4	Modularity	SE5	Infrastructure

Reqt Id	Reqt Text				
	SRS170	3.8.4.1	Sufficient Bandwidth	CD2	Networks
	SRS171	3.9.1	NDE CM Standards	SE4	Documentation
	SRS172	3.9.2	Testing Requirements	SE4	Documentation Infrastructure
	SRS173	3.9.2.1	Algorithm Testing Expectations	PG8	Documentation
	SRS174	3.9.2.2	System Test Staffing	I1	Infrastructure
	SRS175	3.9.2.3	OPS Success Rate	I1	Infrastructure
	SRS176	3.9.2.4	Sanity Check for Install into Test	SE3	Infrastructure
	SRS177	3.11.1	MMC Service Requests	SM20	Monitoring and Control
	SRS178	3.11.2	IPO Service Requests	SM20	Monitoring and Control
	SRS179	3.11.3	Identify Performance Statistics for Capture	SE11	Monitoring and Control
	SRS180	3.11.4	Operators Monitor Latency	CO1	Monitoring and Control
	SRS181	3.11.5	Problem Resolution	AS1	Monitoring and Control
	SRS182	3.11.6	Identify Algorithm Test Procedures	SE4	Documentation
	SRS183	3.11.7	Identify Automated Backup Procedures	SM7	Infrastructure
	SRS184	3.11.8	Restart Procedures	SM8	Infrastructure
	SRS185	3.11.9	Procedures to Protect Data Integrity	SM9	Monitoring and Control
	SRS186	3.11.10	Data Authorization Procedures	SM10	Monitoring and Control

Reqt Id	Reqt Text				
	SRS187	3.11.9.1	Monitor Operational Quality	SM17	Monitoring and Control
	SRS188	3.11.11	Degrated Operations Notification	SM16	Monitoring and Control
	SRS189	3.11.12	Archive Data and System Elements Used	DA4	Distribution
	SRS190	3.11.13	Retrieve Archived Data	DA8	Ingest
	SRS191	3.11.14	Process Archived Data	DA9	Product Generation
	SRS192	3.14.1.1	xDR Availability	CD1	Infrastructure
	SRS193	3.14.1.2	Distribution Availability	CD3	Distribution
	SRS194	3.14.2.1	IDPS Data Access Latency	I2	Infrastructure
	SRS195	3.14.2.2	MMC Message Latency	I2	Monitoring and Control
	SRS196	3.14.2.4	SARSAT PassThrough	CD7	Distribution
	SRS197	3.14.2.5	A-DCS PassThrough	CD8	Distribution
	SRS198	3.14.2.6	Recovery from Natural Disasters	SM9	Infrastructure
	SRS199	3.14.6	SEI Capability Maturity Model	SM1	Documentation
	SRS200	3.14.7	Certification and Accreditation	SE6	Documentation
	SRS201	3.14.8	NOAA IT Best Practices	SE8	Infrastructure
	SRS202	3.14.9	Promotion of System Elements	I1	Production
	SRS203	3.14.10	Development Lifecycle Tools	SE3	Documentation
	SRS204	3.10.1	Adopt Design Methodology	SE12	Documentation

Reqt Id	Reqt Text				
	SRS205	3.2.1.1.1	Data Product Definition GUI	PG8	Ingest
	SRS206	3.2.1.1.3	Data Product Approval	PG8	Ingest
	SRS207	3.2.1.2.1	Algorithm Definition GUI	PG8	Product Management
	SRS208	3.2.1.1.2	Tailoring Tool Definition GUI	PG1	Ingest
	SRS209	3.2.3.1.1	User Subscriptions	CD6	Distribution
	SRS210	3.2.3.1.3	Receipt from CLASS	XF7	Distribution
	SRS211	3.2.3.3.2	Manual Order Status Notification	SM19	Distribution
	SRS212	3.2.4.1	User Registration	SM10	Customer Services
	SRS213	3.2.4.1.1	User Registration GUI	SM10	Customer Services
	SRS214	3.2.4.1.2	User Registration Approval	SM10	Customer Services
	SRS215	3.10.2	Use Proven Technologies	SE13	Infrastructure
	SRS216	3.2.3.4.1	Trade Study and Alternatives	CD5	Distribution
	SRS217	3.10.2.1	Use a 4GL	SE14	Infrastructure
	SRS218	3.11.15	Allocate Human Resources	SM4	
	SRS219	3.11.16	Report on Task Performance	SM6	Monitoring and Control
	SRS220	3.2.4.3	NDE Service Responses	XF13	Customer Services
	SRS223	3.14.1.6.1	Data Products for Authorized Users	XF2	Customer Services
	SRS224	3.14.1.6.2	Data Products in Real-Time	XF3	Customer Services

Reqt Id	Reqt Text				
	SRS225	3.14.1.6.3	Data Products for Developers	XF4	Customer Services
	SRS235	3.3.8	ESPC Trouble Tickets	SM16	Infrastructure
	SRS237	3.14.3.1	Operational Environment	SE2	Infrastructure
	SRS243	3.3.1	IDPS Data Acquisition	XF1	Ingest
	SRS244	3.3.2	External Ancillary Data Acquisition	PG9	Ingest
	SRS56	3.2.1.3	Receive from IDPS	PG8	Ingest
	SRS57	3.2.1.3.1	xDR Ingest from IDPS	PG8	Ingest
	SRS58	3.2.1.3.4	Product Subscriptions to the IDPS	XF1	Ingest
	SRS59	3.2.1.3.5	Ad Hoc Requests to the IDPS	XF1	Ingest
	SRS60	3.2.1.3.6	Data Delivery Notifications	XF1	Ingest
	SRS61	3.2.1.4	Ancillary Data Product Acquisition	PG9	Ingest
	SRS62	3.2.1.3.2	SARSAT Telemetry from IDPS	XF1	Ingest
	SRS63	3.2.1.3.3	A-DCS Data from IDPS	XF1	Ingest
	SRS64	3.2.1.3.7	Send IDPS Data Receipt	XF1	Ingest
	SRS65	3.2.1.5	Receive from CLASS	XF7	Ingest
	SRS66	3.2.1.5.1	Data Products from CLASS	XF7	Ingest
	SRS67	3.2.1.5.2	System Elements from CLASS	XF8	Ingest
	SRS70	3.2.1.5.3	Send CLASS Data Receipt	XF7	Ingest
	SRS72	3.2.2.1	Configure Scientific Algorithms	SE2	Production

Reqt Id	Reqt Text				
	SRS73	3.2.2.2	Schedule Algorithm Execution	PG8	Production
	SRS74	3.2.2.3	Data Product Generation	PG8	Production
	SRS76	3.2.1.1	Define Data Products	PG8	Ingest
	SRS77	3.2.1.2	Define System Elements	PG8	Product Management
	SRS78	3.2.2.1.1	Integrate Delivered Algorithm Packages	SE2	Production
	SRS79	3.1.1	Open Mode	SM12	Infrastructure
	SRS80	3.1.2	Degraded Operations Mode	SM15	Infrastructure
	SRS81	3.1.3	Data Denial Mode	SM13	Infrastructure
	SRS83	3.14.3	NDE Environments	SE2	Infrastructure
	SRS84	3.14.3.3	Quasi-Operational Environment	I1	Infrastructure
	SRS85	3.14.3.2	Segregated Development Environment	I3	Infrastructure
	SRS86	3.14.2.3	System Capacity/Product Volumes	I1	Distribution
	SRS87	3.2.5.2	Provide Automatic Failover	DD5	Monitoring and Control
	SRS88	3.14.1.5	Interruptions to Product Generation	CO1	Infrastructure
	SRS89	3.14.1.3	Interruptions to Operations	SE2	Infrastructure
	SRS91	3.14.1.4	Interruptions to Development	SE3	Infrastructure
	SRS92	3.14.4	Federal Enterprise Architecture	SE1	Documentation
	SRS93	3.8.3.2	COTS and Open Source	SE10	Infrastructure

<table>
<tr><td>Reqt Id</td><td>Reqt Text</td></tr>
<tr><td></td><td>
<table>
<tr><td>SRS94</td><td>3.14.5</td><td>Government Capability Maturity Model</td><td>SE7</td><td>Documentation</td></tr>
<tr><td>SRS95</td><td>3.1.2.1</td><td>Degraded Operations Notification</td><td>SM16</td><td>Infrastructure</td></tr>
<tr><td>SRS96</td><td>3.1.3.1</td><td>Data Denial Notification</td><td>SM14</td><td>Customer Services</td></tr>
<tr><td>SRS99</td><td>3.2.2.1.2</td><td>Test Algorithms</td><td>SE3</td><td>Production</td></tr>
</table>
</td></tr>
<tr><td>SRS34</td><td><h1>6. APPENDIXES</h1></td></tr>
<tr><td>SRS35</td><td><h2>6.1 Glossary</h2>TBD.</td></tr>
<tr><td>SRS55</td><td><h2>6.2 Acronyms and Abbreviations</h2>TBD.</td></tr>
<tr><td>SRS249</td><td><h2>6.3 NDE Contract Section J Matrices</h2>Definitions Used in construction of the Section J Matrices:
Desired Outcomes
What do we want to accomplish as the end result of this contract?

Required Service
What task must be accomplished to give us the desired result?

Performance Standard
What should the standards for completeness, reliability, accuracy, timeliness, quality and/or cost be?

Monitoring Method
How will we determine that success has been achieved?

System Engineering Outcomes Matrix</td></tr>
</table>

Reqt Id	Reqt Text				
		Desired Outcomes	Required Service	Performance Standard	Monitoring Method
	SE1	The ESPC will have an IT Architecture compliant with government standards and that meets NESDIS requirements.	The contractor shall develop an IT Enterprise Architecture (EA) that is consistent with "Table 1 Federal Enterprise Architecture (FEA)." (NOTE: Guidance on applying the FEA to NDE Design is available at the FEA web site: http://www.whitehouse.gov/omb/egov/a-1-fea.html	The IT Enterprise Architecture (EA) will be compliant with the OMB Federal Enterprise Architecture (FEA). The EA will also be compliant with guidance from the NESDIS CIO's Office. EA will include documentation in Table 1.	~Analysis of designs
	SE2	Lower the cost and risks of operating the systems that will generate and distribute NPOESS-derived products to customers	Design Requirement A: Design an Operational Environment The contractor shall design and provide a reliable cost estimate of an NDE product processing system (develop a set of diagrams and supporting text) with an open architecture, such that its capabilities can be executed by other satellite data processing applications and can easily be operated on other platforms. Capabilities that must be specified in this design include, but are not limited to: – Database management systems (DBMS) – Work management and scheduling systems – Libraries – Object repositories – Object repository content • Shared data objects (i.e., lookup tables, ancillary data) • Shared procedural objects (i.e., utilities, called-modules, subroutines, etc.)	Open Architecture: During the first year of the contract, prior to coding, the contractor shall develop a set of diagrams and supporting text that describes NDE product processing in the context of all NESDIS data processing missions. Reusability: During the first year of the contract, prior to coding, the contractor shall provide a set of diagrams and supporting text that describes an NDE product processing system in which the maximum number of system elements are accessible by the greatest possible number of product processing applications. Reliability: The NDE operational environment will be designed for a high degree of reliability-maintain full operational status 98% of the time over any 12 month period. Performance: The NDE operational environment will be designed for optimal resource utilization Security: The NDE operational environment will be designed for a high degrees of confidentiality, integrity, and availability	~Analysis of designs

Reqt Id	Reqt Text						
		SE3	Lower the cost and risks of developing, maintaining, and enhancing the system's data processing and scientific capabilities	Design Requirement B: Design a Development EnvironmentSpecify and provide a reliable cost estimate of a shared, scalable infrastructure for use by developers and maintainers of data processing functions and of scientific algorithms that replicates, to the greatest extent possible, the system described as fulfillment of Design Requirement A (above). As well, the Development Environment Design will specify a suite of proven development life cycle tools to enhance NESDIS capabilities in performing developmental and software maintenance tasks. Technologies in this category are: CASE tools, modeling tools, 4th Generation Languages, Testing Tools, requirements tracking tools, etc..	Open Architecture: During the first year of the contract, prior to coding, the contractor shall develop a set of diagrams and supporting text that describes NDE development capabilities in the context of all NESDIS data processing missions.Reusability: During the first year of the contract, prior to coding, the contractor shall provide a set of diagrams and supporting text that describes a developmental IT infrastructure in which developmental resources (tables, CASE tools, 4GLs, utilities, compilers, the maximum number of system elements can be accessed by environmental satellite product developers. Performance: The NDE development environment will be designed for optimal resource utilization Maintainability: Thecontractor provides a set of recommendations for the most appropriate development tools demonstrating that they are: ~ widely supported in the remote sensing software industry ~ the most likely to be known by future NESDIS support staff Reliability: The NDE development environment will be designed for a high degree of reliability - accessible to no less than 100 developers 95% of the time over any 12 month period Security: The NDE development environment will be designed for a high degrees of confidentiality, integrity, and availability Partitioning: The NDE development environment will be designed to support segregated domains to support different levels of testing (e.g.; unit, string, etc.)	~Analysis of designs	

Reqt Id	Reqt Text					
		SE4	Lower the cost and risks of transitioning system elements into operations	Design Requirement C: Design a System Test Environment Specify and provide a reliable cost estimate of a segregated test capability that replicates, to the greatest extent possible, the system described as fulfillment of Design Requirement A (above). The System Test Environment must support the following: • Provide a capability for products to be generated and distributed to customers throughout the NPP mission. (NOTE: The System Test environment will be used to generate NPP products for customers as "quasi-operational.") • Evaluate candidate system elements for operational fitness, performing appropriate - Analysis of documentation in terms of conformity to Configuration Management Standards (tbd) - Parallel tests - Stress Tests - Regression Tests• Cooperate with NESDIS algorithm developers to identify System Test procedures, standards, and the criteria to be applied in determining a system element's fitness for operational status • Provide a reliable, easily accessible source of information to developers about the criteria that will be applied by the System Test team to determine a system element's fitness for operational status. This information will include, at a minimum: system test submission procedures, documentation requirements, test script requirements, test scenario requirements, and test data requirements.	Ease of Use, Efficiency, Manageability: During the first year of the contract, prior to coding, the contractor shall provide a set of diagrams, supporting text, and procedures that describe a System Test Environment to be administered and operated in such a way that all elements submitted to them for testing and review can be evaluated for operational fitness in less than five working days after submission by developers.	~Analysis of System Test Designs	

Reqt Id	Reqt Text					
	SE5	Ability to isolate, alter, and test the system functions	The contractor shall develop the data processing elements of the future system in such a way that algorithms are invoked as objects with hidden information.	Modularity: During the project, prior to coding, the contractor shall provide a set of diagrams and supporting text that describes how algorithms are to be invoked as objects	~Analysis of designs	
	SE6	The contractor's design shall meet IT security standards (see System Management Requirements G through J)	The contractor shall provide documentation needed for Information System Certification and Accreditation.	Documentation is complete and high quality. Documentation includes IT Security Plan, Risk Assessment, Security Test and Evaluation Plan, and Contingency Plan.	~Analysis of designs	
	SE7	ESPC is built according to government standards and Maturity Models.	The contractor shall use Government Maturity Models for Configuration Control of documentation, Information System components, EA, and IT Security.	CM, EA, and IT Security conform with accepted Government Level 4 Maturity Models.	~Analysis of designs	
	SE8	Costs are reduced and system transition is easier.	The contractor shall design and build the NDE Information System using NOAA IT Best Practices provided by NDE Project Manager.	Technical Reference Model is compared to NDE collection of NOAA Best Practices.	~Analysis of designs	
	SE9	The use of existing hardware and software reduces cost.	The contractor shall use existing hardware and software where it is possible, practical, and approved by the Government. Inventory will be provided to the contractor by OSDPD IT Lead.	Design documentation identifies existing hardware and software used.	~Analysis of designs	
	SE10	Vendor-supported COTS and Open Source software is used to reduce development costs.	The contractor shall use Commercial-Off-the-Shelf (COTS) and Open Source software packages where practical, possible, and approved by the Government.	Design documentation identifies COTS used.	~Analysis of designs	
	SE11	Ability to make system management decisions on the basis of system-generated metrics	The contractor shall identify standard measures of automated system component performance that can be captured during run-time and retrieved for analysis	Measurability: During the project, prior to coding, the contractor shall provide diagrams and supporting text describing: ~ numerical data elements of execution performance (time, volume, number of invocations, etc.) ~ how the performance metrics are to be stored and used for reporting	~Analysis of designs	

Reqt Id	Reqt Text					
	SE12	Effectively manage design and development of the system's data processing capabilities	Project Management Requirement: The contractor shall plan and control the NDE project in a manner that is consistent with a widely accepted software engineering methodology.	Manageability: The contractor: ~ Shall identify the widely accepted software engineering methodology to be used on the project ~ Shall develop and maintains Work Breakdown Structures and Project Plans consistent with the Methodology ~ Shall create work products consistent with those described by the methodology ~ Shall report project status in terms of the likelihood that methodology-defined deliverables will be provided on schedule.	~Status Reporting	
	SE13	Effectively maintain the system's data processing components with a pool of readily available software engineers.	The contractor shall develop the data processing elements of the future NDE system using the latest proven technologies (programming languages, CASE tools, object repositories, data base management systems, etc.) that are appropriate for remote sensing data processing.	Maintainability: As early as possible during the Design Project, the contractor shall provide a set of recommendations for the most appropriate development tools demonstrating that they are: ~ widely supported in the remote sensing software industry ~ the most likely to be known by future NESDIS support staff	~Analysis of Recommendations	
	SE14	Effectively manage maintenance and enhancements of the system's data processing capabilities	The contractor shall develop the data processing elements of the future NDE system using tools that will support the ability to alter executable components without altering source code.	Maintainability: Prior to coding, the contractor shall develop a set of recommendations for the development tools (4th generation programming languages, integrated CASE tools, object repositories, data base management systems, etc.) that will promote, to the greatest extent possible, the ability to alter executable elements without altering source code.	~Analysis of designs	

System Management Outcomes Matrix

Reqt Id	Reqt Text

	Desired Outcomes	Required Service	Performance Standard	Monitoring Method
SM 1	The system management processes will improve continuously	System Management Requirement A: The contractor's system management capabilities shall be evaluated in terms of Software Engineering Institute's (SEI) Capability Maturity Model (CMM)	Software Management Capability: Certified CMM Level 2 during proposal evaluation, Certified CMM Level 3 three years after contract award and thereafter	Software Management Capability: Evaluation by an independent agency every three years.
SM 2	Work, both automated and manual, is performed according to a predetermined schedule.	System Management Requirement B: The contractor shall schedule tasks	Completeness: Automated tasks associated with temporal events will be initiated by an automated scheduler. Completeness: Manual tasks necessary to achieve NESDIS objectives are planned Reliability: 99% of scheduled tasks will execute on time	Completeness: NESDIS inspection of scheduler reports Reliability: NESDIS inspection of Performance Logs
SM 3	NOAA priorities and processing dependencies influence the level of effort and sequence of tasks	System Management Requirement C: The contractor shall prioritize tasks	Completeness: All predecessor and successor relationships of system elements are documented Quality (Measurability): The relative importance of tasks to each other is represented numerically. Quality: Necessary predecessor tasks provide input and/or control information to dependent tasks	Quality: NESDIS inspection of design documents and performance logs
SM 4	Contractor staff is assigned to perform tasks	System Management Requirement D: The contractor shall allocate resources to perform planned tasks	Quality : Project Plans identify separate tasks and their associated schedule, resource, and effort estimate	Quality: NESDIS inspection of project plans
SM 5	The state of the system is always known.	System Management Requirement E: The contractor shall monitor performance	Quality: The contractor is able to report on the status of all scheduled tasks at all times	Quality: NESDIS analysis of system performance logs Quality: NESDIS analysis of project management status reports
SM 6	The contractor reports on the cost and schedule status of tasks	System Management Requirement F: The contractor shall report system performance	Quality: The contractor produces reports on the status of all scheduled tasks	Quality: NESDIS analysis of system performance logs Quality: NESDIS analysis of project management status reports

Reqt Id	Reqt Text					
	SM 7	The NDE System can recover from unexpected failures	System Management Requirement G: The contractor shall develop and implement automated backup procedures for all NDE data and procedures for each of the 3 environments: Operations, Development, System Test	Data Currency: The NDE system stores all data necessary to commence normal operations of each of the 3 environments using data that was current at the time a system failure took place Data Integrity: Backed-up versions of NDE operational, developmental, and System Test data are identical to versions of the data in use at the time of the backup Conformance to Standards: NDE's automated backup of data and procedures conforms to NESDIS standards User Need: The priority of system recovery procedures are based on user community (i.e., end users, developers, non-subscribers, etc.) needs as determined by management decision	Data Currency: Analysis of System Test logs for recovery and restart scenarios of each of the 3 environments Data Integrity: Analysis of System Test logs of automated data backup of each of the 3 environments Conformance to Standards: Comparison of the written descriptions of NDE's automated backup capabilities with NESDIS standards	
	SM 8	The NDE System can recover from unexpected failures	System Management Requirement H: The contractor shall develop and implement procedures to restart each of the 3 NDE environments (Operations, Development, System Test) using backed-up, current data.	Data Currency: Each of the restarted NDE systems commence normal operations using data that was current at the time a system failure took place Reliability: After restart, automated procedures in each of the 3 environments perform their functions as they did prior to system failure Conformance to Standards: NDE's automated recovery procedures conform to NESDIS standards User Need: The priority of system recovery procedures are based on user community (i.e., end users, developers, non-subscribers, etc.) needs as determined by management decision Recovery Time: Each of the NDE systems can be restarted to satisfy a Recovery Time Objectives (RTO) tbd by NESDIS Management	Data Currency: Analysis of System Test logs for recovery and restart scenarios of each of the 3 environments Reliability: Analysis of System Test logs of automated recovery of each of the 3 environments Conformance to Standards: Comparison of the written descriptions of NDE's automated backup capabilities with NESDIS standards	

Reqt Id	Reqt Text				
	SM 9	NDE data assets are valid	System Management Requirement I: The contractor shall implement secure procedures and technologies to protect the integrity of NDE's data in the event of: ~ human errors when data is entered, ~ errors that occur when data is transmitted from one computer to another, ~ software bugs or viruses, ~ hardware malfunctions, such as disk crashes, and ~ natural disasters, such as fires and floods	Data Integrity: Conformance to NESDIS, DOC, and other relevant government security standards	Data Integrity: Analysis of System Test logs of scenarios that threatened data validity
	SM 10	NDE data assets are confidential	System Management Requirement J: The contractor shall implement procedures and technologies to ensure that NDE information is accessible only to those authorized to have access	Confidentiality: Conformance to NESDIS, DOC, and other relevant government security standards	Confidentiality: Analysis of System Test logs of scenarios that threatened NDE confidentiality
	SM 11	NDE data assets are available	see System Operations Requirement G & H (above):	Availability: see System Management Requirement H (above)	Availability: see System Operations Requirement G & H (above)
	SM 12	The Operational system operates in an Open Mode	System Operations Requirement A: The contractor shall develop and implement procedures to make data available to all users in Open Mode.	~ Completeness & Accuracy: In Open mode, all data is available to all customers and developers	~ Completeness & Accuracy: Analysis of System Performance logs
	SM 13	The Operational system operates in a Data Denial mode	System Operations Requirement B: The contractor shall develop and implement procedures to make data available only to authorized users in Data Denial mode	~ Completeness & Accuracy: In Data Denial mode, data is available only to authorized customers and developers	~ Completeness & Accuracy: Analysis of System Performance logs
	SM 14	The Operational system operates in a Data Denial mode	System Operations Requirement C: The contractor shall develop and implement procedures to notify all authorized customers when the system is in Data Denial mode	~ Completeness & Accuracy: In Data Denial mode, notifications are sent to authorized customers and developers	~ Completeness & Accuracy: Analysis of System Performance logs

Reqt Id	Reqt Text				
	SM 15	The Operational system operates in a Degraded Operations mode	System Operations Requirement D: The contractor shall develop and implement procedures to consult with the government (e.g., will NCEP models be adversely affected?) in order to determine whether to alter distribution of products when NPOESS is in a Degraded Operations mode.	~ Quality: In NPOESS Degraded Operations mode, products are distributed only if they will have no adverse affect on customer observations	~ Completeness & Accuracy: : Analysis of communication logs between ESPC and NPOESS ~ Completeness & Accuracy: : Analysis of System Performance logs
	SM 16	The Operational system operates in a Degraded Operations mode	System Operations Requirement E: The contractor shall develop and implement procedures to consult with the government and notify affected customers when NPOESS is in a Degraded Operations mode.	~ Completeness: In Open mode, all data is available to all users ~ Quality: In NPOESS Degraded Operations mode, customers are notified of operational impacts of affected products	~ Completeness: Analysis of communication logs between ESPC and NPOESS, System Performance logs, and Trouble Tickets originating from affected customers
	SM 17	Operational products are delivered to customers only if they conform to predetermined standards of quality	System Operations Requirement F: The contractor shall develop and implement procedures to control operational product quality by identifying deficiencies of ingested data or metadata received from the IDPS	Quality: Recognition and reporting of all Quality Flags received from IDPS Quality: Detection of xDR and metadata attributes that are below agreed NDE thresholds of acceptability	~ Analysis of Performance Logs ~ Analysis of Trouble Tickets of product problems ~ Analysis of Service Requests for product quality improvement
	SM 18	Operational products are delivered to customers only if they conform to predetermined standards of quality	System Operations Requirement G: The contractor shall develop and implement procedures to control operational product quality by supporting any quality control of NDE output (e.g., products or metadata) performed within each of the NDE product processing applications.	Standards: Maintenance of information concerning actions to be taken in the event of quality deficiencies Quality: Invocation of all previously agreed procedures and notifications to address the consequences of low quality (containing attributes below agreed NDE thresholds of acceptability) xDRs, NOAA-unique products, NDE tailored products, and metadata.	~ Analysis of Performance Logs ~ Analysis of Trouble Tickets of product problems ~ Analysis of Service Requests for product quality improvement
	SM 19	Customers (including developers) are provided with information about their orders and system conditions of concern to them.	The contractor shall develop and implement procedures to support notification of users	Customer Satisfaction: Customers are satisfied with their ability to obtain information about the status of their orders	Customer Satisfaction: Analysis of Customer Satisfaction Surveys.

Reqt Id	Reqt Text

SM 20	NESDIS requests changes to NPOESS products and services through the NPOESS Change Control Board.	The contractor shall develop and implement procedures to submit Service Requests to NPOESS (both the MMC and the IPO CCB), to log and track these Service Requests, and to log and track all NPOESS responses	Customer Satisfaction: Customers are satisfied with NDE procedures to request product changes	Customer Satisfaction: Analysis of Service Requests, tracking logs, and Customer Satisfaction Surveys.
SM 21	All correspondence regarding the ESPC is kept	The contractor shall develop and implement procedures to log and track all correspondence	Completeness: All electronic and written correspondence is retained and accessible for inspection.	Completeness: Inspection of correspondence by date, author, and subject
SM 22	Requests for changes are saved	The contractor shall develop and implement procedures to log and track Requests for NDE Service, including product enhancement requests, and NDE responses	Customer Satisfaction: Customers are satisfied with NDE procedures to request product changes	Customer Satisfaction: Analysis of Service Requests and Customer Satisfaction Surveys.
SM 23	Information about system performance will be kept	The contractor shall develop and implement procedures to log performance data	Completeness: Statistics of execution performance (time, volume, number of invocations, etc.) are logged and maintained for analysis (see Software Engineering Design Requirement D)	~ Analysis of System Performance Logs and Reports
SM 24	System performance reports are produced	The contractor shall develop and implement scheduled and on-demand procedures to report performance data	Completeness: Reports of system performance (time, volume, number of invocations, etc.) are generated on demand and according to a schedule	~ Analysis of System Performance Logs and Reports

Infrastructure Outcomes Matrix

	Desired Outcomes	Required Service	Performance Standard	Monitoring Method

Reqt Id	Reqt Text					
	I 1	Establish an infrastructure for System Testing that is consistent with Software Engineering Requirement C	Implement key components of the NDE System Test capability to process and distribute data and products from NPP according to a schedule consistent with Table 2: Timetable of NDE Infrastructure Tasks ~ Acquire or lease all System Test infrastructure elements required: hardware, COTS software, telecommunications, middleware, etc. ~ Install and integrate all primary System Test infrastructure components ~ Operate and administer the System Test infrastructure ~ Execute all necessary upgrades to System Test infrastructure components in accordance with vendor changes and NESDIS standards ~ Manage multiple versions of source code and other reusable objects	~ Throughput: For NPP alone, 4TB/day ~Quality: System elements placed in the operational environment perform without degrading the performance of other operational elements. ~Quality: 95% of system elements placed in the operational environment perform for three cycles (i.e., orbital, daily, weekly, etc.) without failing or causing other system elements to fail or perform less effectively ~Efficiency a: System Test Environment to be administered and operated by a permanent team of no more than five IT professionals in such a way that all elements submitted to them for testing and review can be evaluated for operational fitness in less than five working days after submission by developers. ~Efficiency b: System elements and components that are placed in the operational environment can be executed immediately without failing or causing other system elements to fail or perform less effectively . ~ Business Continuity: In the event of an emergency failure of the operational environment, the System Test Environment will be able to deliver products to the operational community within the same throughput and latency parameters as the operational system. (See Performance Standards for Operations above) ~ Scalability: Additional capacity (throughput, latency, performance)	~ Quality: Analysis of System Performance logs ~ Efficiency: Analysis of System Test activity reports ~ Business Continuity: Analysis of System Performance logs ~ Scalability: Analysis of upgrade activity logs	

Reqt Id	Reqt Text						
		I 2	Establish a scalable infrastructure for operational product generation and distribution, beginning with NPP, that is consistent with Software Engineering Design Requirement A, in order to provide telecommunications, data management, storage, and processing capabilities to support the NPP satellite mission.	Implement the NDE Operational capability according to a schedule consistent with Table 2: Timetable of NDE Infrastructure Tasks: ~ Acquire or lease all operational infrastructure elements required: hardware, COTS software, telecommunications, middleware, etc. ~ Install and integrate all the necessary operational infrastructure components ~ Operate and administer the operational infrastructure ~ Execute all necessary upgrades to infrastructure components in accordance with vendor changes and NESDIS standards	~ Throughput: For NPP alone, 4TB/day For NPP and NPOESS C1, 8 TB/day For NPOESS C1 and C2, 8 TB/day For NPOESS C1, C2, and C3, 12 TB/day ~ Latency: products available to customers less than 5 minutes after final receipt of all necessary data elements (standard to be applied for 98% of all products) ~ Scalability: Additional capacity (throughput, latency, performance) can be created without redesign of the operational infrastructure ~ Interoperability: Able to receive data from IDPS in real time ~ Interoperability: Able to send/receive messages to/from the NPOESS Mission Management Center (MMC) in real-time. ~ Interoperability: Able to deliver (push) products to customer systems in the event that customers choose this method of delivery	Throughput, Latency: ~ Analysis of System Test Logs generated no later than October 1 2008 (or 18 months prior to NPOESS C1 launch if launch date slips). ~ After NPP LEOP, NOAA inspection of Product Generation Control Logs Scalability: ~Interoperability: Analysis of System Performance Logs	

Reqt Id	Reqt Text					
	I 3	Establish an infrastructure for use by developers of NDE data processing capabilities and by developers of science algorithms (e.g., development environment) that is consistent with Software Engineering Requirement B	Implement key components of the NDE Development capability according to a schedule consistent with Table 2: Timetable of NDE Infrastructure Tasks~ Acquire or lease all developmental infrastructure elements required: hardware, COTS software, telecommunications, middleware, etc.~ Install and integrate primary development infrastructure components ~ Operate and administer the developmental infrastructure~ Execute all necessary upgrades to development infrastructure components in accordance with vendor changes and NESDIS standards ~ Manage multiple versions of source code and other reusable objects	~ Interoperability: Ability to send/receive data and messages with the NPOESS ground system, particularly the IDPS, is demonstrated by December 2006~ Efficiency: Developers believe that the environment supports them without interfering with their creativity or productivity~ Capacity: Algorithms and system utilities can be tested using high volumes (tbd) of stored historical, experimental, and test data~ Reliability: Historical datasets are stored and administered in order to guarantee their integrity and currency ~ Reusability: Developers install system elements (i.e., data, procedures, objects) into their programs that have been extracted from controlled "libraries" to create functionality ~ Reusability: Developers perform tests using previously developed elements (test scripts, test data, test scenarios, etc.) ~ Scalability: Additional capacity (throughput, latency, performance) can be created without redesign of the Development infrastructure	~ Efficiency: Biannual Evaluation of Developer Satisfaction Surveys and monthly analysis of Trouble Tickets and Service Requests received from developers. ~Capacity: Tests using historical data execute in no more than 50% of the clock time of an equivalent product generation execution in the operational environment ~Reusability: Design Inspections, Code Inspections

Data Archive and Retention Outcomes Matrix

	Desired Outcomes	Required Service	Performance Standard	Monitoring Method
DA 1	Data Retention: Recently generated products are available for additional processing	The contractor shall develop and implement procedures to retain NOAA-unique Products for 72 hours	~ Quality - Minimal (tbd) retrievals from CLASS of NOAA-unique products that are less than 72 hours old	

Reqt Id	Reqt Text					
	DA 2	Data assets will be managed at the system level in all three environments	The contractor shall provide resources and implement procedures to add, update, and delete shared data resources in a controlled manner according to agreed user (either developer, tester, or customer) needs in each of the three environments.	Data Integrity: Data resources (including test, historical, and experimental data and metadata) are maintained with a minimum of duplication. Data Integrity: Data resources (including test, historical, and experimental data and metadata) are deleted after a reasonable (tbd) interval of disuse	Data Integrity: Analysis of performance logs of system utilities routinely performed to detect duplication and eliminate wasted data storage space	
	DA 3	Data Retention: Users, both customers and developers, can obtain the same operational product more than once within 72 hours.	The contractor shall develop and implement procedures to manage and retain data if requested by a user	~ Completeness, Latency - All requested products are retained for up to 72 hours	Analysis of Service Requests for product retention	
	DA 4	Archive: All system elements necessary for NDE operational product generation are archived.	The contractor shall develop and implement procedures to deliver to NOAA's Long Term Archive (CLASS) all data and system elements required by NDE for processing tailored products or NOAA-unique products. These include, minimally: o Metadata o Ancillary data o Processes used to create products, including system configurations, software processes, and necessary parameters o TBD intermediate products per process	~ Completeness - Evidence of receipt by CLASS	~ Inspection of CLASS receipts	
	DA 5	Archive: All system elements necessary for NDE product generation in the development environment are archived.	The contractor shall develop and implement procedures to store and manage all data and system elements required by NDE developers for testing. These include, minimally: o Metadata o Ancillary data o Processes used to create products, including system configurations, software processes, and necessary parameters o TBD intermediate products per process	~ Completeness - Evidence of receipt by CLASS	~ Inspection of CLASS receipts	

Reqt Id	Reqt Text				
	DA 6	Archive: All operational NOAA-unique products are archived.	The contractor shall develop and implement procedures to deliver all NOAA-unique products generated by the NDE system NOAA's Long Term Archive (CLASS)	~ Completeness - Evidence of receipt, by CLASS, of all NOAA-unique products generated by the NDE system	~ Inspection of CLASS receipts
	DA 7	Archive: A catalog of NDE's archived material is available	The contractor shall develop and implement procedures to provide catalog information for archived data	Completeness, Accuracy - The contractor shall provide catalog information for archived data	~ Ability to retrieve any cataloged item from CLASS ~ Inspection of catalog
	DA 8	Archive: Archived data is used by NDE product processing	The contractor shall develop and implement procedures to retrieve archived data	Reliability- The contractor retrieves archived data Timeliness - The contractor retrieves archived data as quickly as allowed by CLASS performance capabilities	~ Observation
	DA 9	Archive: Archived data is used by NDE product processing	The contractor shall develop and implement procedures to process archived data	Timeliness, Quality - The contractor shall process archived data	~ Demonstration
	DA 10	Information about NDE's products and NPOESS observations shall be retained for future use.	The Contractor shall develop and implement procedures to conform to metadata standards	Completeness, Accuracy – The Contractor reports on violations of metadata standards (e.g., FGDC Content Standard for Digital Geospatial Metadata) .	Inspection of metadata reports
	DA 11	Users of archived NDE products will be provided with information about whether the data values are outside of agreed, standard ranges.	The Contractor shall develop and implement procedures to provide notification of data anomalies of archive data to customers	~ Accuracy – The Contractor identifies all instances of anomalous data values ~ Timeliness, Customer Service – Prior to archiving, the Contractor links a notification of anomalous data values to all instances of any product containing the detected anomaly	~ Inspection of data quality logs ~ Inspection of user notifications
	DA 12	NDE can replace products that it has previously archived with instances of the products in which anomalies have been repaired.	The Contractor shall develop and implement procedures to change archived products through version control	~ Conformance to Standards – The Contractor shall be knowledgeable of archiving standards ~ Completeness - The Contractor shall report all instances of archived product replacements to management	Inspection of reports detailing changes to archived data.
	External Interfaces Outcomes Matrix				

Reqt Id	Reqt Text

	Desired Outcomes	Required Service	Performance Standard	Monitoring Method
XF 1	Receipt of data and products from NPOESS Interface Data Processing Segment (IDPS) (Note: "Data and products" refers to, at a minimum, products [including SARSAT & A-DCS], ancillary data, auxiliary data, and metadata,)	~ The contractor shall provide a capability for receiving data and products from IDPS. ~ The contractor shall provide a capability for determining whether the data and products ingested by NDE from IDPS are the same as the data and products that were sent.	Completeness, Reliability, Timeliness: 100% of the data sent by the IDPS is received in real time	NESDIS inpection of Performance logs
XF 2	Data is made available to customers and developers (NOTE: "Customers" are defined in Section 2 of the NDE Project Plan.)	The contractor shall provide a capability for ensuring that NDE's tailored products and NOAA-unique products are made available to authorized customers and developers	Completeness, Reliability, Timeliness: 100% of the products sent are received in real time	NESDIS inpection of Performance logs
XF 3	Products are made available for customer retrieval	The contractor shall provide a capability for ensuring that NDE's tailored products and NOAA-unique products are placed in locations from which they can be retrieved by customers in real time	Reliability: 100% of the products placed for retrieval can be extracted	NESDIS inpection of Performance logs
XF 4	Products are made available for retrieval by developers in NOAA and Cooperative Institutes	The contractor shall provide a capability for ensuring that NDE's tailored products and NOAA-unique products are placed in locations from which they can be retrieved by developers	Reliability: 100% of the products placed for retrieval can be extracted	NESDIS inpection of Performance logs
XF 5	Transmission of product to Comprehensive Large Array-data Stewardship System (CLASS)	The contractor shall send NDE's NOAA-unique products to CLASS.	Completeness, Reliability, Timeliness: 100% of the data sent to CLASS is received in real time	NESDIS inpection of Performance logs

Reqt Id	Reqt Text					
	XF 6	Transmission of system components to Comprehensive Large Array-data Stewardship System (CLASS) (NOTE: "System elements" is inclusive of all system objects invoked to create or tailor a product, including, but not limited to, time-stamped source code, time-stamped control tables such as those containing the actual correlation coefficients used for processing, and any associated time-stamped documentation.)	The contractor shall send NDE elements (Source Code, Utilities, Algorithms, Control Tables, etc.) to CLASS.	Completeness, Reliability, Timeliness: 100% of the system elements sent to CLASS are received in real time	NESDIS inpection of Performance logs	
	XF 7	Receipt of products from Comprehensive Large Array-data Stewardship System (CLASS)	The contractor shall receive xDRs and NOAA-unique products from CLASS.	Completeness, Reliability, Timeliness: 100% of the data sent by CLASS is received in real time	NESDIS inpection of Performance logs	
	XF 8	Receipt of system elements from Comprehensive Large Array-data Stewardship System (CLASS)	The contractor shall receive NDE elements from CLASS	Completeness, Reliability, Timeliness: 100% of the system elements sent by CLASS are received in real time	NESDIS inpection of Performance logs	
	XF 9	Interface to the NPOESS Mission Management Center (MMC)	The contractor shall provide an interface for NDE to the MMC	Completeness, Reliability, Timeliness: ~100% of the inquiries to the MMC and replies to MMC requests are received by the MMC in real time ~100% of the notifications and inquiries from the MMC are received by the MMC in real time	NESDIS inpection of Performance logs	
	XF 10	Interface with the IPO's Service Request System	The contractor shall provide an interface for NDE Service Requests to the IPO	Completeness, Reliability, Timeliness: ~ 100% of the NDE Service Requests intended for the IPO's attention are delivered to the IPO ~ 100% of the IPO's responses to the NDE Service Requests intended for the IPO's attention are	NESDIS evaluation of regular status reports	

Reqt Id	Reqt Text

			received by the contractor	
XF 11	Interface with NPOESS' IDPS operations	The contractor shall provide an interface for ESPC's operations to communicate with the IDPS operations	Completeness, Reliability, Timeliness: ~ 100% of the NDE communications intended for the IDPS operator's attention are delivered to IDPS operations ~ 100% of the IDPS operator's responses to the NDE communications are received by the contractor	NESDIS evaluation of regular status reports
XF 12	Customers and developers receive products in a desired format.	The contractor shall provide a capability for receiving NDE Service Requests (SRs) from customers.	~ Availabity 24 X 7 ~ Ease of Customer Use TBD ~ Ease of Operator Use TBD	NOAA inspection
XF 13	Customers and developers obtain tools to reformat products on their systems.	The contractor shall provide a capability to respond to NDE service requests with Service Responses.	~ Ease of Customer Use TBD ~ Ease of Operator Use TBD	Analysis of automated Help System Reports

Product Generation Outcomes Matrix

	Desired Outcomes	Required Service	Performance Standard	Monitoring Method
PG 1	The customer receives products in a desired format.	Product Format Requirement: The contractor shall provide and implement software to reformat the HDF5 data records received from the Interface data Processing Segment (IDPS) into customer-specified formats. The requirement applies to both tailored and NOAA-unique NDE environmental satellite data products. Anticipated formats include, but are not limited to, the following: BUFR, GRIB, FF, GIF, GeoTIF, McIDAS, HDF, SARAD, SATEM, NetCDF.	Accuracy & Completeness - Reformated Products must have identical content to the HDF5 versions received from the IDPS	~ NESDIS Inspection of Products ~ Customer Satisfaction Surveys

Reqt Id	Reqt Text					
	PG 2	The customer obtains tools to reformat products on his system.	HDF5 Data Conversion Tools Requirement: The contractor shall make available, for use at customer sites, software that will convert the HDF5-format NPOESS xDRs into one of several, specified (tbd) formats.	System Compatability - Data Conversion tools must be capable of execution by customers using "standard" operating systems (e.g., LINUX, AIX,) and telecommunications (e.g., FTP, Internet, API). Accuracy & Completeness - The products reformatted with the NOAA-supplied data conversion tools must have identical content to the HDF5 versions received from the IDPS	~ NESDIS Inspection of Products ~ Customer Satisfaction Surveys	
	PG 3	Product Tailoring Requirement A: The products are received by customers in a compressed state.	Lossless Product Compression Requirement: The contractor shall provide and implement software to compress both tailored and NOAA-unique NDE environmental satellite data products, using customer specified compression formats. Anticipated compression formats include, but are not limited to, the following: GZIP, ZIP.	Accuracy & Completeness - De-compressed product must have identical content to the pre-compressed versions.	~ NESDIS Inspection of Products ~ Customer Satisfaction Surveys	
	PG 4	Product Tailoring Requirement B: The products are received by customers in a compressed state.	Lossy Product Compression Requirement: The contractor shall provide and implement software to compress both tailored and NOAA-unique NDE environmental satellite data products, using customer specified, lossy compression formats. Anticipated compression formats include, but are not limited to, the following: RICE, JPEG.	Accuracy & Completeness - De-compressed product must have acceptably similar content (tbd) to the pre-compressed versions.	~ NESDIS Inspection of Products ~ Customer Satisfaction Surveys	
	PG 5	Product Tailoring Requirement C: The customer obtains different projection views of the same product.	Product Projection Requirement: The contractor shall provide and implement software to allow customers to choose specified (tbd), alternative projection views (i.e., platecarre, Mercator, polar stereographic) of both tailored and NOAA-unique NDE environmental satellite data products	Accuracy & Completeness - Products that have been repackaged using projection views (i.e., mercator, polar projection, etc.) other than those of the original product received from the IDPS must contain the same information as the original, IDPS versions of the products. Quality: Projection views provided must conform to standard projection specifications	~ NESDIS Inspection of Products ~ Customer Satisfaction Surveys	

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	PG 6	Product Tailoring Requirement D: The customer receives aggregated products in different frequency ranges.	Product Frequency Requirement: The contractor shall provide and implement software to deliver both tailored and NOAA-unique NDE environmental satellite data products at the frequency specified by customers. Anticipated frequencies include, but are not limited to, the following: Daily, weekly, orbital, etc.(tbd).	Accuracy & Completeness - Aggregated products must accurately represent the separate elements from which the product was assembled.	~ NESDIS Inspection of Products (Comparison of the separate components with the aggregated product) ~ Customer Satisfaction Surveys	
	PG 7	Product Tailoring Requirement E: The customer has a choice of the grid spacing of product	Product Grid Spacing Requirement: The contractor shall provide and implement software to deliver both tailored and NOAA-unique NDE environmental satellite data products with specified (tbd) grid spacing .	Accuracy & Completeness - Re-gridded products must contain no less data than the IDPS-supplied products from which they were derived unless the end-user formally agrees to lower resolution	~ NESDIS Inspection of Products ~ Customer Satisfaction Surveys	
	PG 8	The customer receives NOAA-unique products.	NOAA-unique Product Generation Requirement: The contractor shall provide and implement software to augment the data records received from the Interface Data Processing Segment (IDPS) to generate NOAA-unique environmental satellite data products through application of NOAA-supplied algorithms and utilization of NOAA-supplied data.	Accuracy & Completeness - Each NOAA-unique product will be described in terms of explicit, expected test results prior to the installation of the NOAA-supplied algorithm on the product generation system. The NOAA-unique products must satisfy these test requirements.	~ NESDIS Inspection of Products ~ Customer Satisfaction Surveys	
	PG 9	NDE acquires ancillary data from external sources	Ancillary Acquisition Requirement: The contractor shall retrieve control information necessary for product generation from sources such as NCEP, NAVOCEANO, METOPS, and other external systems.	~ Completeness: 100% of the ancillary data required for product generation will be acquired ~ Reliability: The ancillary data products obtained can be effectively applied in product generation algorithms	~ Completeness: ~NESDIS inspection of Production logs ~ Quality: NESDIS analysis of product accuracy	
	PG 10	The ancillary data delivered to NPOESS is the same as the ancillary data used by NESDIS	Ancillary Data Quality Requirement: The contractor shall review and certify Ancillary Data	~ Completeness: 100% of the ancillary data requested by NPOESS will be distributed to NPOESS ~ Reliability: The ancillary data products provided can be effectively applied in product generation algorithms	~ Completeness: ~NESDIS inspection of Production logs ~ Reliability: NESDIS comparison of IDPS products and algorithms with NPOESS prodiucts and algorithms	

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PG 12	Customers will request product enhancements	Product Enhancement Requirement: The contractor shall provide procedures for capturing the requirements for product enhancement requests	Customer Satisfaction: 90% of customers surveyed report that they were pleased with the procedures for defining their product enhancement requirements	Customer Satisfaction Surveys

Communications and Distribution Outcomes Matrix

	Desired Outcomes	Required Service	Performance Standard	Monitoring Method
CD 1	Customers (e.g., NOAA operational users) obtain NPOESS-based products	Product Delivery Timeliness Requirement: The contractor shall develop and implement procedures to make products available to customers.	~ Availability: Products will be made available to customers within one minute of their receipt from the NESDIS product processing system	~ NOAA Inspection of Daily, Weekly, and Monthly Product Distribution Logs
CD 2	External development organizations exchange very large (TBD), experimental datatsets with NOAA.	The contractor shall provide communication pathways with sufficient bandwidth to allow the exchange of large (TBD), experimental datasets and products between the ESPC and external NOAA development partners such as the Cooperative Institutes.	~ Throughput: >4 (tbc) GB/s	~ Demonstration ~ Analysis of System test logs recording the results of scenarios designed to determine maximum throughput between ESPC and non-NOAA development partners ~ Analysis of Performance Logs
CD 3	Customers obtain NPOESS-based products	Product Delivery Cost Requirement: The contractor shall develop and implement procedures to distribute products to customers at the optimal cost for performance desired.	~ Cost	~ NOAA will monitor/review contract cost as described in the required trade study every three years
CD 4	The NDE network can be accessed only with the authorization of ESPC	Product Delivery Security Requirement: The contractor shall develop and implement procedures to distribute products to customers ensuring compliance to DOC/NOAA security and data integrity policies.	~ Security: The Contractor shall provide to NESDIS a trade study for the choice of the proposed technology.	~ NOAA's inspection of security standards imposed by the contractor.

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	CD 5	NDE adopts an architecture that addresses NPOESS-based product distribution to customers.	Product Delivery Design Requirement: The contractor shall undertake a trade study and report on the costs and benefits of implementing feasible product communication schemes and communication infrastructure alternatives. Among other ideas, the study must encompass providing Points of Presence (POPs) at each of the following customer sites to receive products transmitted from the NOAA Central at the NSOF: \ NESDIS, to Suitland's NSOF \ SARSAT, to Suitland's NSOF \ NWS to a customer-designated POP \ OAR to a customer-designated POP \ NMAO to a customer-designated POP \ NOS to a customer-designated POP \ NMFS to a customer-designated POP \ NOAR to a customer-designated POP \ Academic/Universities Suitand to customer-designated POP(s) \ International/EUMETSAT to a customer-designated POP	~ Availability: Over the course of each calendar year, the NPOESS-derived product distribution capability at NSOF will be operational more than 99% (tbc) of the time each month.	~ Prior to selection, the contractor shall propose a networking infrastructure study plan to meet requirements.	
	CD 6	Customers obtain NPOESS-based products	Product Delivery Performance Requirement: The contractor shall develop and implement procedures to make NPOESS-based products available to customers.	~ Availability: Over the course of each calendar year, the NPOESS-derived product distribution capability at NSOF will be operational more than 99% (tbc) of the time each month.	~ NOAA Inspection of Daily, Weekly, and Monthly Product Distribution Logs	
	CD 7	USMCC receives SARSAT telemetry captured by NPOESS satellites	SARSAT Requirement: The contractor shall distribute SARSAT telemetry from IDPS to USMCC.	~ Timeliness: SARSAT Telemetry captured by NPOESS satellites will be distributed to USMCC within thirty seconds of their receipt by NESDIS.	~ Prior to selection, the contractor shall propose a networking infrastructure plan to meet requirements. ~ NOAA Inspection of Daily, Weekly, and Monthly SARSAT Product Distribution Logs	

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CD 8	The US Global Positioning Center receives ADCS data and telemetry captured by NPOESS satellites.	ADCS Requirement: The contractor shall route ADCS Data from IDPS to the US Global Processing Center.	~ Timeliness: ADCS signals captured by NPOESS satellites will be distributed to the US Global Processing Center within thirty seconds of their receipt by NESDIS	~ Prior to selection, the contractor shall propose a networking infrastructure plan to meet requirements. ~ NOAA Inspection of Daily, Weekly, and Monthly ADCS Product Distribution Logs

NDE Inherited Requirements Outcomes Matrix (specific requirements inherited from ESPC)

	Desired Outcomes	Required Service	Performance Standard	Monitoring Method
AS 1	Problems with application support functions, that disrupt production processing, will be resolved as soon as possible.	The Contractor shall assist in diagnosing and resolving problems with the application support functions.	- Production processing flow shall not be interrupted for more than 2 hours in a day, and no more than 4 hours in a month. - Operator monitoring of production processing shall not be interrupted for more than 2 hours in a day, and no more than 4 hours in a month. - Distribution of production data shall not be interrupted for more than 2 hours in a day, and no more than 4 hours in a month.	Operator logs
CO 1	All ingesting, receiving, processing and distribution of data will be done in a timely manner.	The operators shall check schedules and wall clock for data latency and interface with the appropriate center	All systems shall not be interrupted for more than 2 hours per occurrence.	Ingesting, receiving, processing and distribution logs
DD 5	Work to automate system fail-over capability	Analyze and implement automatic fail-over where is required	Reliability: 99% of system fail overload capability has been automated.	NESDIS analysis of system performance logs.
SA 5	ESPC systems will be secure	The Contractor shall follow ESPC (DOC/NOAA/NESDIS) procedures and policies for securing ESPC systems	An ESPC system, or ESPC data, will never be compromised	

Federal Enterprise Architecture Documentation Requirements Table

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	Federal Enterprise Architecture (FEA) Requirements for Automated Information System Enterprise Architecture and Documentation The contractor shall obtain current guidance on applying the FEA to the NDE Design via the FEA web site: http://www.whitehouse.gov/omb/egov/a-1-fea.html 1.0 Business Reference Model 1.1 Business Processes Which AIS Automates 1.2 Owners of Business Processes 1.3 Roles and Responsibilities 2.0 Service Reference Model 2.1 Services which AIS Automates 2.2 Customers 2.3 Users 3.0 Data Reference Model 3.1 Data Flow 3.2 Data Sources 3.3 Data Users 3.4 Data Description 4.0 Performance Reference Model 4.1 Description of Metrics 4.2 Methods for Measuring System Performance 4.3 Methods for Reporting System Performance 5.0 Technical Reference Model 5.1 System Components 5.2 Hardware 5.3 Software 5.4 Life Cycle Management 5.5 Maintenance Requirements 6.0 Total Cost of Ownership 6.1 Initial Costs 6.2 Maintenance Costs

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	6.3 Projected Replacement Costs 7.0 System Documentation 7.1 Contractor-developed Source Code 7.2 COTS Inventory and Description 7.3 System components inventory 8.0 IT Security 8.1 Security Plan 8.2 Risk Assessment 8.3 Security Test and Evaluation Plan 8.4 Contingency Plan 9.0 Maintenance and Operation (M&O) Documentation 9.1 Administration Procedures (Manual) 9.2 Maintenance Procedures (Manual) 9.3 Technical User's Guide